

# Location Checklist



<b>Operator / #</b>	EXTRACTION OIL & GAS INC / 10459		
<b>Location ID &amp; Name</b>	<a href="#">323253</a> BERGER-62N68W/23SENE		
<b>County</b>	Weld, CO		
<b>Well Information</b>	Well Name:	BERGER #42-23C	
	Well API #:	<a href="#">05-123-12770</a>	
	Lat/Long as Drilled:	40.125952 / -104.962736	
	Plug Date & Form 6s Doc #:	02/25/2015 & <a href="#">400941947</a>	
<b>Facility Entities</b>	<input checked="" type="checkbox"/>	Tank Battery (Off-Site)	Pits
	<input checked="" type="checkbox"/>	Wells	<input checked="" type="checkbox"/> On-Location Flowlines (Form 42) Doc #: <a href="#">401279677</a>
		Domestic Taps	Off-Location Flowlines (Form 44) Doc #: _____
<b>Equipment On-Site</b>	<input checked="" type="checkbox"/>	None	Debris
		Pit mouse/rat holes, cellars backfilled	
<b>Access Road</b>	<input checked="" type="checkbox"/>	Regraded	<input checked="" type="checkbox"/> Contoured
		Culverts removed	<input checked="" type="checkbox"/> Gravel removed
		Pre-Existing (Must provide supporting documentation)	
<b>Reclamation Status</b>	<input checked="" type="checkbox"/>	Location and associated disturbances reclaimed	
		Subsidence	
<b>Spills or Releases (Form 19)</b>	<input checked="" type="checkbox"/>	No	<input type="checkbox"/> Yes
<b>Remediation (Form 27/27A)</b>		No	<input checked="" type="checkbox"/> Yes – Resolved 2019
<b>On-Location Flowlines</b>		No	<input checked="" type="checkbox"/> Yes
<b>Off-Location Flowlines</b>	<input checked="" type="checkbox"/>	No	<input type="checkbox"/> Yes
<b>Inspection Corrective Actions</b>		No	<input checked="" type="checkbox"/> Yes – Resolved 2018
<b>Sundry Notice</b>	Form 4 Doc # & Date:	<a href="#">401150208</a> & 12/02/2016	
	Purpose:	Interim reclamation complete, site ready for inspection.	
	Comments:	None	
	Attachments:	Location Pictures Doc # <a href="#">401150310</a>	
<b>Drone Information</b>	Make & Model	DJI M300/DJI Mavic 3 Multispectral	
	Image Processing Software	Pix4dfields – RGB/Multispectral Imagery & Pix4dmatic – RGB Imagery	
	Pilot Name & FAA Certificate #	Sam Streeter, #4100157	
	Date of FAA Certificate Issuance	23 Dec 2023	

**SITE-SPECIFIC QUALITY ASSURANCE  
& QUALITY CONTROL AUDIT**



**Final Reclamation Complete Notice – Cropland Drone Imagery**

**PERMIT CLOSURE REPORT – CROPLAND**

**Location ID** 323253

**Location Name** BERGER-62N68W/23SENE

**Report Date**

25 Oct 2024

Soil Sage has conducted a thorough data audit as part of our Quality Assurance and Quality Control (QA/QC) protocols. This report was developed in accordance with the ECMC Operator Guidance – Operator supplied cropland drone imagery and information for submitting a final reclamation complete notice.

**Crop Year and Type**

Crop 2024 – Wheat

**Quality Assurance & Quality Control Audit**

<b>Auditor</b>	Soil Sage
<b>Audit Date</b>	06 Mar 2024

**Audit Methodology**

The following source materials were consulted during the QA and QC audit process:

- ✓ Site Permit Closures provided by CIVITAS Resources
- ✓ Colorado Oil & Gas Information System – COGIS Database
- ✓ On-site Evaluation and Proprietary Soil Sage Drone Imagery data collection
- ✓ Review of legacy imagery for site location and facility parameters

All pertinent data, imagery, and materials are included at the end of this report.

## Site Description

<b>Name</b>	BERGER-62N68W/23SENE		
<b>Location ID</b>	<a href="#">323253</a>		
<b>Operator / #</b>	EXTRACTION OIL & GAS INC / 10459		
<b>Field</b>	WATTENBERG / 90750		
<b>County, State</b>	Weld, CO		
<b>Lat/Long</b>	40.125952 / -104.962736		
	Planned Location	<input checked="" type="checkbox"/>	As Drilled
<b>Facility Status</b>	CL	<b>Location</b>	SENE 23 2N68W
<b>Facility Status Date</b>	02/25/2015		
<b>Facility Entities</b>	<input checked="" type="checkbox"/>	Tank Battery (Off-Site)	Pits
	<input checked="" type="checkbox"/>	Wells	Off-Location Flowlines ( <b>Form 44</b> )
		Domestic Taps	<input checked="" type="checkbox"/> On-Location Flowlines ( <b>Form 42</b> )
		Electric Utilities	
<b>Equipment on Site</b>	<input checked="" type="checkbox"/>	No	Yes
		If yes, list:	
		Pit mouse/rat holes, cellars backfilled	
<b>Access Road</b>	<input checked="" type="checkbox"/>	Regraded	<input checked="" type="checkbox"/> Contoured
		Culverts Removed	<input checked="" type="checkbox"/> Gravel Removed
		Pre-Existing: must provide supporting documentation	
<b>Environment Incidents &amp; Remediation</b>		None	Spill or Release ( <b>Form 19</b> )
	<input checked="" type="checkbox"/>	Remediation ( <b>Form 27/27A</b> )	
<b>Variance Requests</b>	<b>No Variance Requests were detected during this QA &amp; QC Audit.</b>		
<b>Inspection Corrective Actions (CA)s</b>	<p><b>Corrective Actions (CA)s were detected during the QA &amp; QC Audit.</b></p> <p><b>CA Overall Status:</b> No Follow Up Action Required</p> <p><b>CA-Approving Inspection Doc # &amp; Date:</b> <a href="#">699301939</a> &amp; 06/17/2020</p> <ul style="list-style-type: none"> <li>○ <b>Inspector:</b> Robbie Revas</li> </ul> <p><b>Originating Field Inspection Report (FIR) Doc # &amp; Date:</b> <a href="#">674902194</a> &amp; 06/19/2018</p> <ul style="list-style-type: none"> <li>○ <b>Overall Status:</b> Follow Up Inspection Required</li> <li>○ <b>Corrective Action:</b> Perform reclamation in accordance to Rule 1004. Remove gravel from the access road; perform compaction alleviation and re- contour/re-grade. Collaborate with the landowner to determine mitigating measures that will allow reclamation work to</li> </ul>		

	<p>be conducted in such a manner as to not interfere with agricultural activities or crop production. Coordinated with the surface landowner and send a Form 4 by 7/3/2018 detailing the agreed upon reclamation timeline with the surface landowner and seed that will be used.</p> <ul style="list-style-type: none"> <li>○ <b>Date Completed:</b> 07/03/2018</li> </ul> <p><b>Complete ECMC Inspection Search Results:</b> <a href="#">Link</a></p>
<b>Sundry Notice (Form 4)</b>	<b>Form 4s were detected during the QA &amp; QC Audit.</b> See individual scout card data for details.
<b>On Location Flowlines (Form 42)</b>	<b>Form 42s were detected during the QA &amp; QC Audit.</b> See individual scout card data for details.
<b>Off-Location Flowlines (Form 44)</b>	<b>No Form 44s were detected during the QA &amp; QC Audit.</b>
<b>Site Investigation and Remediation Workplan (Form 27/27A)</b>	<p><b>Remediation Project #:</b> <a href="#">3858</a></p> <p><b>Form 27A Supplemental Doc # &amp; Date:</b> <a href="#">401800285</a> &amp; 02/05/2019</p> <ul style="list-style-type: none"> <li>○ <b>Purpose:</b> 909.c.(1), Rule 905: Pit or PW vessel closure. 909.c.(2), Rule 906: Spill/Release Remediation. Facility decommissioning in support of final reclamation.</li> <li>○ <b>Lat/Long of Remediation:</b> 40.127334/-104.961316</li> <li>○ <b>Facility Type &amp; Facility ID:</b> Location &amp; <a href="#">323253</a></li> <li>○ <b>Operator Comments:</b> This form has been prepared to document the successful closure of Remediation Project <a href="#">3858</a> at this location. Please find attached a work completion report for a description of site investigation activities and findings, including lab results.</li> <li>○ <b>Closure Request Approved:</b> 02/13/2019 by Chris Canfield</li> <li>○ <b>Final Resolution:</b> <b>Case Resolved on 02/13/2019</b></li> </ul> <p><b>Form 27 Initial Doc # &amp; Date:</b> <a href="#">1396769</a> &amp; 01/26/2007</p> <ul style="list-style-type: none"> <li>○ <b>Purpose:</b> Soils Berm area around Tank. Surface water occasional visible sheen. Vegetation relatively small area by ag-drain.</li> <li>○ <b>Operator Comments:</b> A recovery trench was installed, the agdrain flushed with a biodegradable surfactant, the rinsate was recovered via a vac truck, product and water have been removed from the recovery trench on a routine basis, booms were installed in the unnamed creed, and the affected section of agdrain will be replaced. Additional soil and groundwater assessment activities will be performed to evaluate possible remedial strategies.</li> </ul>

<p><b>Field Inspection Form (Form INSP)</b></p>	<p><b>Form INSP Doc # &amp; Date:</b> <a href="#">699301939</a> &amp; 06/17/2020</p> <ul style="list-style-type: none"> <li>○ <b>Status Summary:</b> NO FOLLOW UP INSPECTION REQUIRED</li> <li>○ <b>Inspected Facilities:</b> BERGER 42-23C Well</li> <li>○ <b>Inspection Status:</b> PA</li> <li>○ <b>Inspection Date &amp; Inspector:</b> 06/17/2020 by Robbie Revas</li> <li>○ <b>Comments:</b> While there, I observed a plugged and abandoned wellsite in the process of reclamation. During this inspection no compliance issues were observed: See attached photos.</li> <li>○ <b>Attachments:</b> Inspection Photos Doc # <a href="#">699301940</a></li> </ul> <p><b>Form INSP Doc # &amp; Date:</b> <a href="#">674902194</a> &amp; 06/19/2018</p> <ul style="list-style-type: none"> <li>○ <b>Status Summary:</b> FOLLOW UP INSPECTION REQUIRED</li> <li>○ <b>Inspected Facilities:</b> BERGER 42-23C Well</li> <li>○ <b>Inspection Status:</b> RI</li> <li>○ <b>Inspection Date &amp; Inspector:</b> 06/07/2018 by Russell Beam</li> <li>○ <b>Comments:</b> This location is not in compliance with Rule 1004. Reclamation rules require reclamation activities to be conducted within three months of plugging on cropland. Well was plugged 2/25/2015 and work should have been completed by 5/25/2015. Gravel remains along the first part of the access road and has not been re-contoured or re-graded and de-compacted to meet the adjacent terrain. Please refer to the attached inspection photos for more detail.</li> <li>○ <b>Attachments:</b> Inspection Photos Doc # <a href="#">674902210</a></li> </ul> <p><b>Form INSP Doc # &amp; Date:</b> <a href="#">668302970</a> &amp; 11/04/2014</p> <ul style="list-style-type: none"> <li>○ <b>Status Summary:</b> THIS IS A FOLLOW UP INSPECTION</li> <li>○ <b>Inspected Facilities:</b> BERGER 42-23C Well</li> <li>○ <b>Inspection Status:</b> SI</li> <li>○ <b>Inspection Date &amp; Inspector:</b> 11/03/2014 by Randell Johnson</li> <li>○ <b>Comments:</b> See related inspection document #<a href="#">668302969</a> for information concerning shared facilities and equipment.</li> </ul>
<p><b>COGIS Tank Facilities Information (Scout Card)</b></p>	<p><b>No Tank Battery documents were detected during this QA/QC Audit.</b> However, the Tank Battery is referenced in Field Inspection Doc #<a href="#">668302970</a> at Lat/Long 40.126760/-104.961250 located to the northeast of Location ID <a href="#">323253</a>.</p>

<b>COGIS Well Information (Scout Card)</b>	<p><b>Well Name:</b> BERGER #42-23C</p> <p><b>API#:</b> <a href="#">05-123-12770</a></p> <p><b>FACILITY ID:</b> 244975</p> <ul style="list-style-type: none"> <li>○ <b>Status &amp; Date:</b> PA &amp; 02/25/2015</li> <li>○ <b>Lat/Long as Drilled:</b> 40.125952 / -104.962736</li> <li>○ <b>Form 6 Doc # &amp; Date:</b> <a href="#">400941947</a> &amp; 01/30/2018</li> <li>○ <b>Form 42 Doc # &amp; Date:</b> <a href="#">401279677</a> &amp; 05/10/2017</li> </ul> <p><b>Purpose:</b> FLOWLINES ABANDONED - per RULE 1103. Date completed: 02/20/2015.</p> <ul style="list-style-type: none"> <li>○ <b>Form 4 Doc # &amp; Date:</b> <a href="#">401150208</a> &amp; 12/02/2016</li> </ul> <p><b>Purpose:</b> Interim reclamation complete, site ready for inspection. Per Rule 1003.e(3) describe interim reclamation procedure in Comments below or provide as an attachment and attach required location photographs.</p> <p><b>Attachments:</b> Location Pictures Doc # <a href="#">401150310</a></p>
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ECMC Abbreviations: [Location & Facility Status Codes](#), [Inspection Types & Statuses](#) and [ECMC Help](#).

## Audit Key Findings – Designation Land Use Observations

PREVIOUS LAND USE	CURRENT LAND USE
<p><b>Reference Imagery for Infrastructure:</b> DRCOG 2008</p>	<p><b>Remotely Sensed Imagery:</b> 24 Aug 2023; 15 Feb 2024; 04 Jun 2024</p>
<p><b>Designation:</b> Oil &amp; Gas Facility</p>	<p><b>Designation:</b> Cropland</p>

### The following imagery sources were reviewed during this audit:

EarthExplorer, DRCOG 2002 - 2014, NAIP Imagery 2011, 2013, 2015, 2017, 2019, 2021, ESRI Maxar and Remotely Sensed Imagery Sep 2022

## Site Observation Notes

No additional information.

In accordance with ECMC guidance, this cropland evaluation has demonstrated that this location has been returned to its original condition and crops are reflective of the cropland reference areas.

## Closure Information

Location ID [323253](#) BERGER-62N68W/23SENE is in Weld County, Colorado near the intersection of Bella Rosa Parkway and Silver Birch Boulevard. There is one plugged and abandoned well (BERGER #42-23C API # [05-123-12770](#)). The Tank Battery is located to the northeast of Location ID [323253](#) and does not have an independent Location ID.

There was a Corrective Action at this location on June 19<sup>th</sup>, 2018, which was to perform reclamation in accordance with Rule 1004. This was resolved on July 3<sup>rd</sup>, 2018, and an ECMC inspection approved the Corrective Action on June 17<sup>th</sup>, 2020.

On January 26<sup>th</sup>, 2007, a Form 27 Initial was submitted for a Spill/Release of Crude Oil for this Location under Remediation Project # [3858](#). Remediation Project # [3858](#) was closed in a Form 27 Supplemental on February 5<sup>th</sup>, 2019, for 909.c.(1), Rule 905: Pit or PW vessel closure, 909.c.(2), Rule 906: Spill/Release Remediation, and facility decommissioning in support of final reclamation.

Berger #42-23C well (API # [05-123-12770](#)) was plugged and abandoned on February 25<sup>th</sup>, 2015. The access road was reclaimed at this time. The related off-site production facility, that does not have an independent Location ID, was closed and reclaimed within the same timeframe.

Soil Sage drone imagery confirms that no equipment was left on site at this location after reclamation activities occurred.

Soils at this site are being affected by **saline, sodic, and saline-sodic soil\*** conditions. While they do not cover the entire reclamation area there is some overlap. These soils are affecting the entire property, and they have been mapped to show how prolific they are.

**\*Saline, sodic, and saline-sodic soils** are problematic soil types that affect plant growth and soil health.

- **Saline soils** have high levels of soluble salts but low sodium. They cause **osmotic stress**, making it hard for plants to absorb water, but the soil retains good structure.
- **Sodic soils** have high sodium content relative to other cations, leading to **poor soil structure**, compaction, and reduced water infiltration, which harms plant growth.
- **Saline-sodic soils** have both high salt and sodium levels, causing **both osmotic stress and structural problems**, making them particularly challenging for plant survival.

Table 1. Salt-Affected Soil Classification

Classification	Electrical Conductivity (mS/cm)	Soil pH	Exchangeable Sodium Percentage	Soil Physical Condition
Saline	> 4.0	< 8.5	< 15	Normal
Sodic (alkali)	< 4.0	> 8.5	> 15	Poor
Saline-sodic	> 4.0	< 8.5	> 15	Normal

> = greater than, < = less than

## Summary Acreage Table

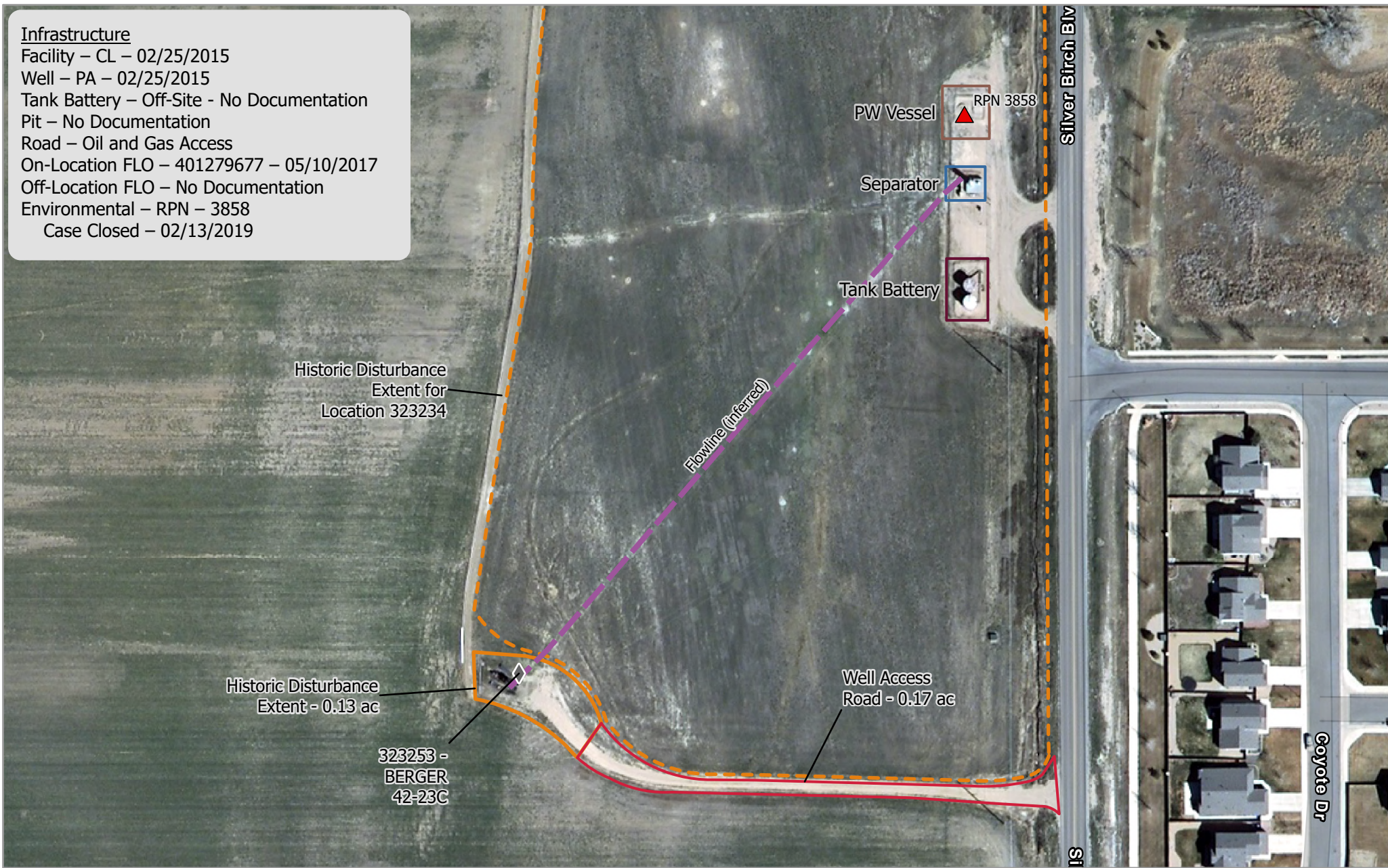
Description	Acres
Historic Disturbance Extent	0.30
Access Road	0.17
Flowline	Not Included
Tank Battery	Off-Site
Well Pad	0.13

## Drone Information

<b>Make</b>	DJI
<b>Model</b>	M300/Mavic 3 Multispectral
<b>Image Processing Software</b>	Pix4dfields – RGB/Multispectral Imagery & Pix4dmatic – RGB Imagery
<b>Pilot Name</b>	Sam Streeter
<b>Pilot FAA Certificate Number</b>	4100157
<b>Date of FAA Certificate Issuance</b>	23 Dec 2023

**Infrastructure**

- Facility – CL – 02/25/2015
- Well – PA – 02/25/2015
- Tank Battery – Off-Site - No Documentation
- Pit – No Documentation
- Road – Oil and Gas Access
- On-Location FLO – 401279677 – 05/10/2017
- Off-Location FLO – No Documentation
- Environmental – RPN – 3858
- Case Closed – 02/13/2019



**CIV - 323253- BERGER 42-23C**  
**Map Extent - Pre-Plugging Overview**

Imagery: DRCOG  
 Imagery Date: 2008  
 Map Date: 14 Oct 2024  
 Datum: WGS 1984 UTM Zone 13N  
 POC: Soil Sage

◆ Wells	□ Well Access Road
▲ Remediation	□ Tank Battery
— Flowline	□ Separator
□ Historic Disturbance Extent	□ PW Vessel

0 20 40 80 Meters

Total Disturbance: 0.30 Acres

Scale: 1:1,400

Pad Location: 40.125952  
 -104.962736

N

**Infrastructure**

- Facility – CL – 02/25/2015
- Well – PA – 02/25/2015
- Tank Battery – Off-Site - No Documentation
- Pit – No Documentation
- Road – Oil and Gas Access
- On-Location FLO – 401279677 – 05/10/2017
- Off-Location FLO – No Documentation
- Environmental – RPN – 3858
- Case Closed – 02/13/2019



**CIV - 323253- BERGER 42-23C**  
**Map Extent - Post-Plugging Overview**

Imagery: RS Orthomosaic  
 Imagery Date: 24 Aug 2023  
 Map Date: 14 Oct 2024  
 Datum: WGS 1984 UTM Zone 13N  
 POC: Soil Sage

- |                               |                     |
|-------------------------------|---------------------|
| ◆ Wells                       | □ Tank Battery      |
| ▲ Remediation                 | □ Separator         |
| 📷 Observation Points          | □ PW Vessel         |
| — Flowline                    | ▨ Saline Soil       |
| ▭ Historic Disturbance Extent | ▤ Saline-Sodic Soil |
| ▭ Well Access Road            | ⋯ Pivot Access Road |

0 20 40 80 Meters

Total Disturbance: 0.30 Acres  
 Scale: 1:1,400

Pad Location:  
 40.125952  
 -104.962736

N

# Cardinal Directional Drone Photos & Reference Area Photos

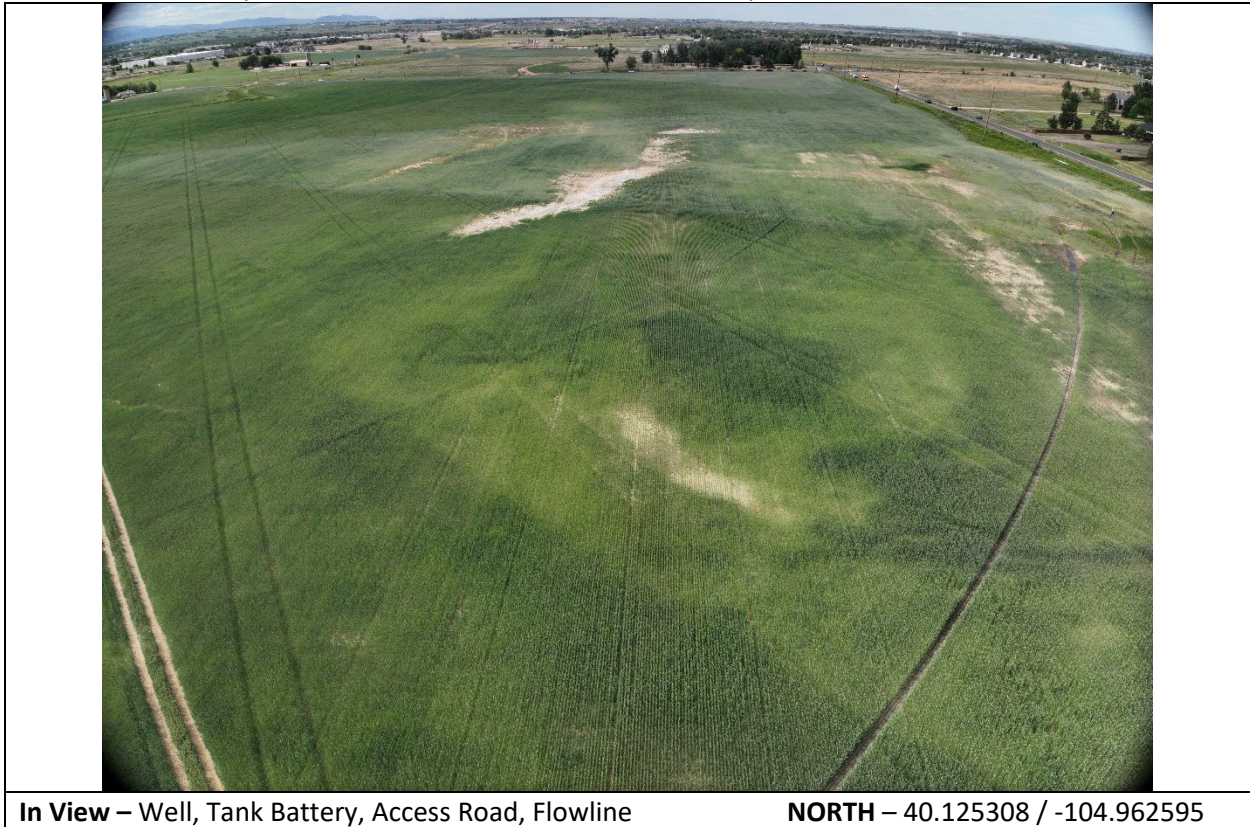
*Site Investigation and Photos Date*

04 Jun 2024

*Drone Photo Height*

120 feet

Cardinal directional photos of the site. Reference overview map.





**In View – Well, Tank Battery, Access Road, Flowline**

**NORTH – 40.125310 / -104.962632**



**In View – Well, Tank Battery, Access Road, Flowline**

**EAST – 40.126005 / -104.963888**



**In View** – Well, Access Road, Flowline

**SOUTH** – 40.126808 / -104.962743



**In View** – Well, Access Road, Flowline

**WEST** – 40.125957 / -104.961890



**In View** – Well, Access Road, Flowline



**NORTHWEST** – 40.125349 / -104.962713

# Off-Location Tank Battery Within Cropland – Handheld Photographic Evidence

## Site Investigation and Photos Date

04 Jun 2024

Handheld photos taken from Tank Battery Location northeast of Location ID [323253](#). Tank Battery does not have a Location ID. No handheld photos taken from Location ID [323253](#) wellhead location due to crop height.

	
Looking Southeast – Wheat – 40.126639/-104.961309	Looking South – Wheat – 40.126671/-104.961274



Looking South – Cattails – 40.12659/-104.961374



Looking South – Seep – 40.126927/-104.961433



Looking South – Water from Seep – 40.126842/ -104.96142



Looking South – Saline Soil from Seep – 40.126835/-104.961434



Looking Southwest – Sodic Soil from Seep –  
40.126846/-104.961426



Looking Southwest – Cattails –  
40.126656/-104.961393

*Cardinal Directional Drone Photos Showing No Equipment Remaining*

Site Investigation and Photos Date

15 Feb 2024

Drone Photo Height

115 feet

Cardinal directional photos of the site. Reference overview map.



**In View** – Well, Access Road, Flowline

**NORTH** – 40.125424 / -104.962752



**In View – Tank Battery, Access Road, Flowline**

**NORTH – 40.126151 / -104.961438**



**In View – Well, Tank Battery, Access Road, Flowline**

**NORTHEAST – 40.125613 / -104.963211**



**In View** – Well, Tank Battery, Access Road, Flowline

**EAST** – 40.125982 / -104.963291



**In View** – Tank Battery, Access Road, Flowline

**EAST** – 40.126886 / -104.963089



**In View** – Well, Access Road, Flowline

**SOUTH** – 40.126641 / -104.962709



**In View** – Well, Tank Battery, Access Road, Flowline

**SOUTH** – 40.128090 / -104.961326



**In View** – Well, Access Road, Flowline

**WEST** – 40.125921 / -104.962162



**In View** – Well, Tank Battery, Access Road, Flowline

**WEST** – 40.126941 / -104.960695

# ATTACHMENTS

## Maps and Figures

### *Area Maps*

Elevation & Contours

Hydrology

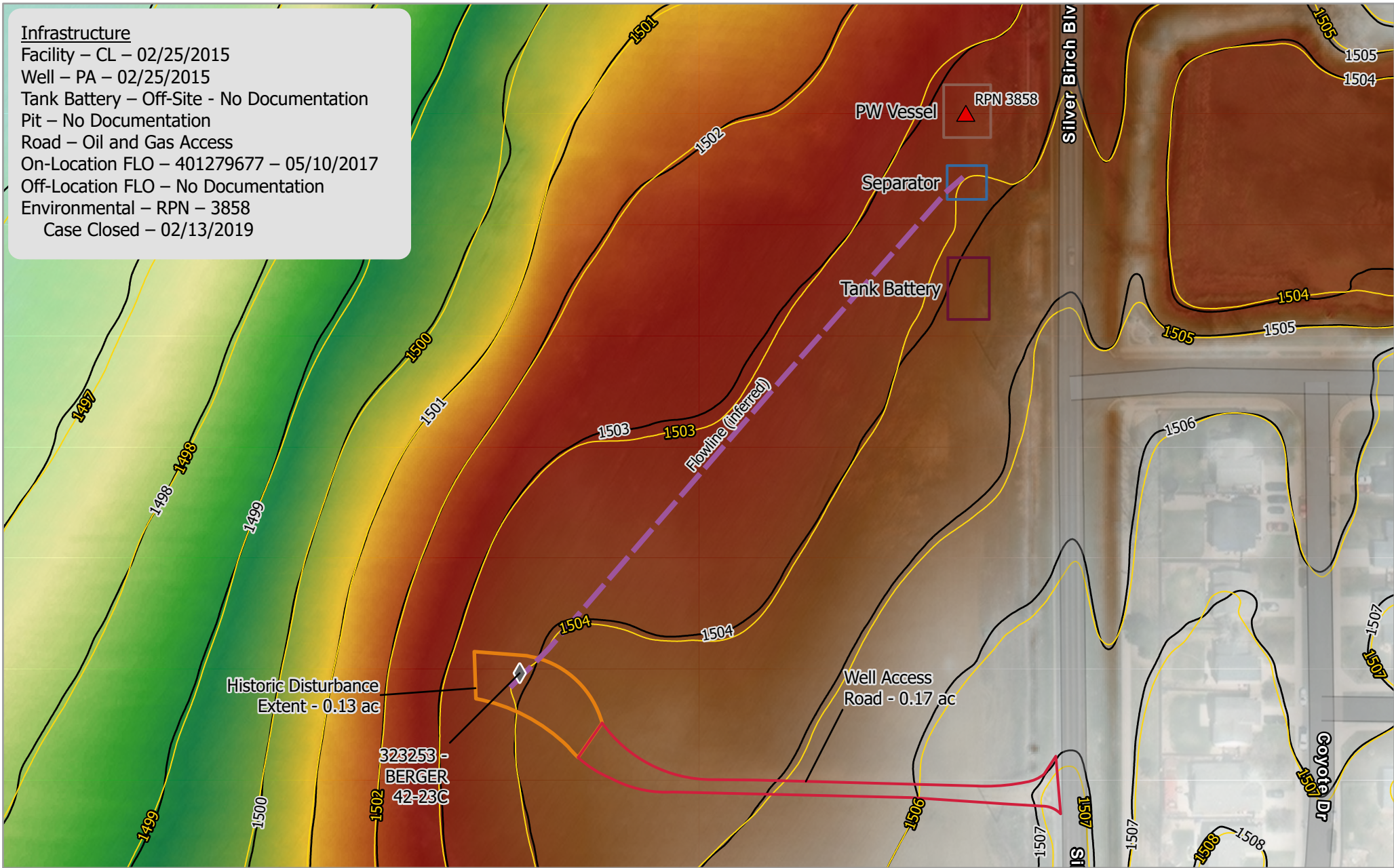
## Background Information

### *Natural Resources Conservation Service (NRCS) Map Unit Description*

Reference Soil Document

**Infrastructure**

- Facility – CL – 02/25/2015
- Well – PA – 02/25/2015
- Tank Battery – Off-Site - No Documentation
- Pit – No Documentation
- Road – Oil and Gas Access
- On-Location FLO – 401279677 – 05/10/2017
- Off-Location FLO – No Documentation
- Environmental – RPN – 3858
- Case Closed – 02/13/2019



**CIV - 323253- BERGER 42-23C**  
**Map Extent - Elevation and Contours**

Imagery: DRCOG, USGS Elevation  
Imagery Date: 2020, 2014  
Map Date: 14 Oct 2024  
Datum: WGS 1984 UTM Zone 13N  
POC: Soil Sage

◆ Wells	□ Tank Battery
▲ Remediation	□ Separator
— Flowline	□ PW Vessel
~ 1 Meter Contours (2020)	Elevation
~ 1 Meter Contours (2014)	Meters
▭ Historic Disturbance Extent	1518
▭ Well Access Road	1491

0 20 40 80 Meters

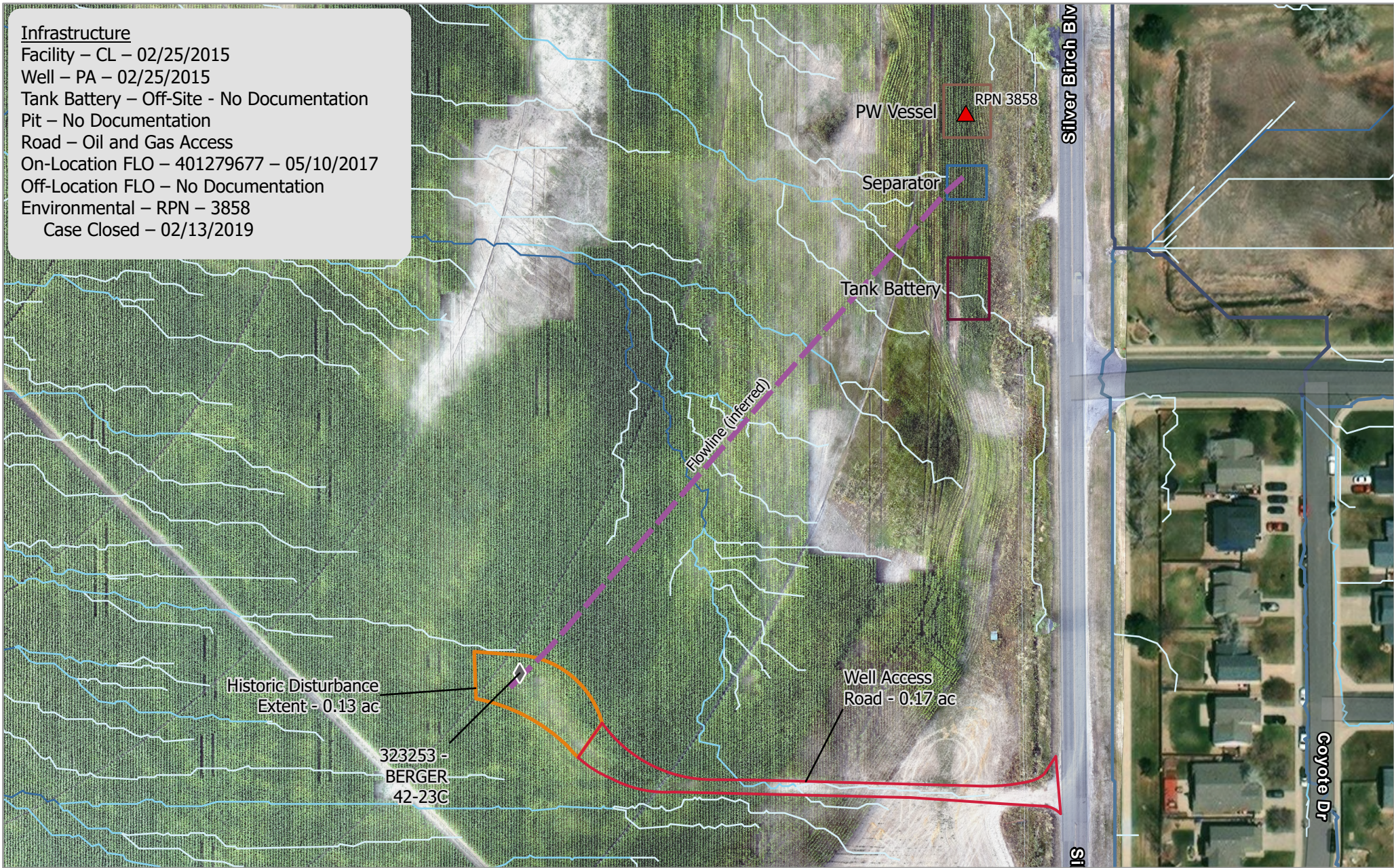
Total Disturbance: 0.30 Acres  
Scale: 1:1,400

Pad Location: 40.125952  
-104.962736

Service Credits - Esri Community Maps Contributors, © OpenStreetMap, Microsoft, Esri, TomTom, Garmin, SafeGraph, GeoTechnologies, Inc., MET/NASA, USGS, EPA, NPS, US Census Bureau, USDA, USFWS, Navar

**Infrastructure**

Facility – CL – 02/25/2015  
 Well – PA – 02/25/2015  
 Tank Battery – Off-Site - No Documentation  
 Pit – No Documentation  
 Road – Oil and Gas Access  
 On-Location FLO – 401279677 – 05/10/2017  
 Off-Location FLO – No Documentation  
 Environmental – RPN – 3858  
 Case Closed – 02/13/2019



**CIV - 323253- BERGER 42-23C**  
**Map Extent - Hydrology**

Imagery: DRCOG Elevation, RS  
 Orthomosaic  
 Imagery Date: 2020, 24 Aug 2023  
 Map Date: 14 Oct 2024  
 Datum: WGS 1984 UTM Zone 13N

- |                               |              |
|-------------------------------|--------------|
| ◆ Wells                       | ▭ PW Vessel  |
| ▲ Remediation                 | Stream Order |
| — Flowline                    | — 1          |
| ▭ Historic Disturbance Extent | — 2          |
| ▭ Well Access Road            | — 3          |
| ▭ Tank Battery                | — 4          |
| ▭ Separator                   | — 5          |



Total Disturbance:  
 0.30 Acres  
 Scale: 1:1,400

Pad Location:  
 40.125952  
 -104.962736



Service Credits - Maxar, Microsoft, Esri  
 Community Maps Contributors, ©  
 OpenStreetMap, Microsoft, Esri, TomTom,  
 Garmin, SateLabs, GeoTechnologies, Inc.  
 METI/NASA, USGS, EPA, NPS, US Census  
 Bureau, USDA, USFWS



# Soil Properties

## USDA Soil Description

### Reference Soil Information

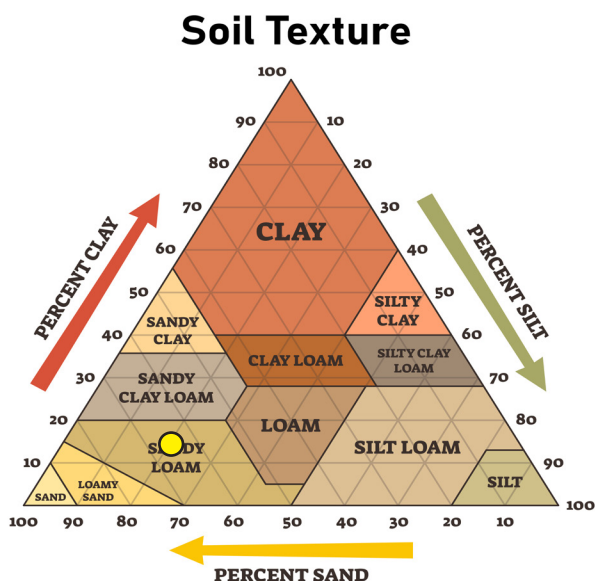
The location of the site is contained within three soil types, Olney fine sandy loam at two slopes and Tassel fine sandy loam.

### Map Unit 47 Reference Soil information - Olney Fine Sandy Loam

This soil is formed from mixed deposit outwash. Landform is plains. Ecological Site Description is Sandy Plains. Soils are well-drained with a moderate water holding capacity, and slope 1 to 3 percent.

Depth (in)	Physical			Chemical			
	Texture	Bulk Density	Particle Size Percent sand, silt, clay	pH	EC	SAR	OM%
0-10	Fine Sandy Loam	1.43	65-20-15	7.2	0.0	0.0	0.75
10-20	Sandy Clay Loam	1.33	56-18-27	7.2	0.0	0.0	0.75
20-25	Sandy Clay Loam	1.33	60-18-23	8.2	1.0	0.0	0.25
25-60	Fine Sandy Loam	1.50	64-27-10	8.5	1.0	0.0	0.25

### Soil Texture Triangle reflect the 0-10 in depth



### Erosion Potential (10 inches)

- K Factor, Whole soil - .24. Values of K range from 0.02 to 0.69. Other factors being equal, the higher the value, the more susceptible the soil is to sheet and rill erosion by water.
- Wind Erodibility Group – 3. The soils assigned to group 1 are the most susceptible to wind erosion, and those assigned to group 8 are the least susceptible.

# Soil Properties

## USDA Soil Description

### Reference Soil Information

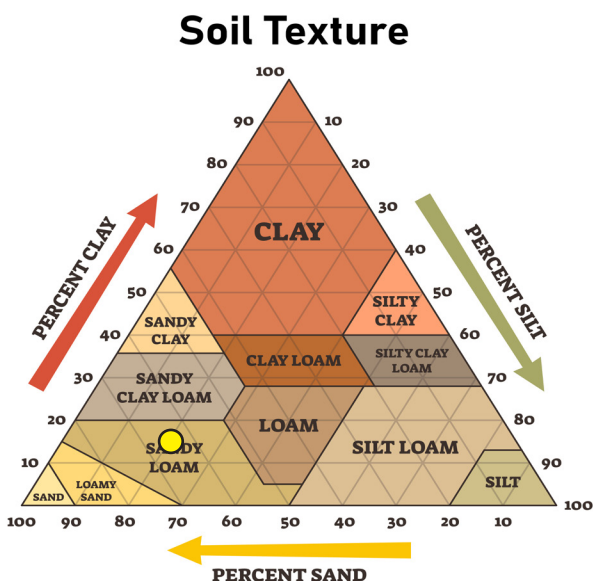
The location of the site is contained within three soil types, Olney fine sandy loam at two slopes and Tassel fine sandy loam.

### Map Unit 48 Reference Soil information - Olney fine sandy loam

This soil is formed from mixed deposit outwash. Landform is plains. Ecological Site Description is Sandy Plains. Soils are well-drained with a moderate water holding capacity, and slope 3 to 5 percent.

Depth (in)	Physical			Chemical			
	Texture	Bulk Density	Particle Size Percent sand, silt, clay	pH	EC	SAR	OM%
0-10	Fine Sandy Loam	1.43	65-20-15	7.2	0.0	0.0	0.75
10-20	Sandy Clay Loam	1.33	56-18-27	7.2	0.0	0.0	0.75
20-25	Sandy Clay Loam	1.33	60-18-23	8.2	1.0	0.0	0.25
25-60	Fine Sandy Loam	1.50	64-27-10	8.5	1.0	0.0	0.25

### Soil Texture Triangle reflect the 0-10 in depth



### Erosion Potential (10 inches)

- K Factor, Whole soil - .24. Values of K range from 0.02 to 0.69. Other factors being equal, the higher the value, the more susceptible the soil is to sheet and rill erosion by water.
- Wind Erodibility Group – 3. The soils assigned to group 1 are the most susceptible to wind erosion, and those assigned to group 8 are the least susceptible.

# Soil Properties

## USDA Soil Description

### Reference Soil Information

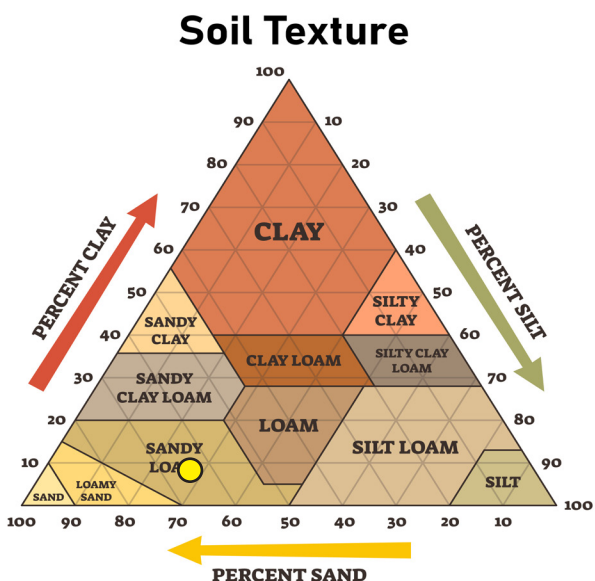
The location of the site is contained within three soil types, Olney fine sandy loam at two slopes and Tassel fine sandy loam.

### Map Unit 61 Reference Soil information - Tassel fine sandy loam

This soil is formed from residuum weathered from sandstone. Landform is breaks. Ecological Site Description is Sandstone Breaks. Soils are well-drained with a very low water holding capacity, and slope 5 to 20 percent.

Depth (in)	Physical			Chemical			
	Texture	Bulk Density	Particle Size Percent sand, silt, clay	pH	EC	SAR	OM%
0-11	Fine Sandy Loam	1.43	65-27-9	7.9	0.0	0.0	0.75
11-15	Very Fine Sandy Loam	1.48	64-26-11	7.9	0.0	0.0	0.75
15-20	Weathered Bedrock	N/A	N/A	N/A	N/A	N/A	N/A

### Soil Texture Triangle reflect the 0-10 in depth



### Erosion Potential (10 inches)

- K Factor, Whole soil - .37. Values of K range from 0.02 to 0.69. Other factors being equal, the higher the value, the more susceptible the soil is to sheet and rill erosion by water.
- Wind Erodibility Group – 3. The soils assigned to group 1 are the most susceptible to wind erosion, and those assigned to group 8 are the least susceptible.

## Soil Reference Information

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There is a general relationship of soil bulk density to root growth based on soil texture. Bulk densities ideal for root growth are less than 1.60 g/cc for sandy textures, less than 1.40 g/cc for loamy textures, and less than 1.10 g/cc for clayey textures. Bulk densities that restrict root growth are greater than 1.80 g/cc for sandy textures, 1.65 g/cc for loamy textures, and 1.47 g/cc for clayey textures.

# Vegetation

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## Reference vegetation – Sandy Plains Ecology

### Climate

Average Annual Precipitation 14 to 17 inches annually - average 15 inches

Average Annual Air Temperature ranges from 50 to 52 degrees F

Drought conditions in effect

Long-term effects of these latest drought events have yet to be determined. Growth of native cool-season plants begin about April 1 and continue to mid-June. Native warm-season plants begin growth about May 1 and continue to about August 15. Regrowth of cool-season plants occur in September in most years, depending on moisture.

### Reference dynamics

The Reference State is characterized by 70-85% grasses and grass-like plants, 10-15% forbs, and 5-15% woody plants. The dominant tall warm season grasses are prairie sandreed, sand bluestem and switchgrass. Blue grama dominates the understory. Important cool season grasses and grass-likes are needle and thread and sun sedge. Key forbs and shrubs are American vetch, pacific peavine (manystem pea), purple prairie clover, and spreading buckwheat.

Drought has increased mortality of blue grama in some locations.

Well suited for carbon sequestration.

## Reference Vegetation – Sandy Plains Ecology

### At Risk Plant Community

Key species from the Reference Plant Community, sand bluestem, prairie sandreed, switchgrass, leadplant and western sandcherry have decreased in frequency and production. Blue grama has increased. Sand dropseed, Fendler threeawn, hairy goldaster, croton, slimflower scurfpea, western ragweed, stickleaf, heath aster, lupine, loco, milkvetch and plains pricklypear cactus have increased. Soils that have a sandy loam or coarser subsoil will show an increase in sand sagebrush.

The risk of losing key warm-season tallgrasses, important forbs and shrubs is a major concern. Blue grama is increasing at the expense of the tallgrasses and deep-rooted shrubs. Water cycle, nutrient cycle and energy flow may become impaired due to a shift in root structure and species composition. Less litter is being produced.

# Vegetation

## Sandy Plains Ecosystem Vegetative Community Composition

Common Name	Scientific Name
Blue Grama	<i>Bouteloua gracilis</i>
Prairie Sandreed	<i>Calamovilfa longifolia</i>
Sand Bluestem	<i>Andropogon hallii</i>
Switchgrass	<i>Panicum virgatum</i>
Needle and Thread	<i>Hesperostipa comata</i>
Western Wheatgrass	<i>Pascopyrum smithii</i>
Little Bluestem	<i>Schizachyrium scoparium</i>
Indiangrass	<i>Sorghastrum nutans</i>
Sideoats Grama	<i>Bouteloua curtipendula</i>
Sand Dropseed	<i>Sporobolus cryptandrus</i>
Indian Ricegrass	<i>Achnatherum hymenoides</i>
Buffalograss	<i>Bouteloua dactyloides</i>
Thin Paspalum	<i>Paspalum setaceum</i>
Purple Prairie Clover	<i>Dalea purpurea</i>
Upright Prairie Coneflower	<i>Ratibida columnifera</i>
Scarlet Globemallow	<i>Sphaeralcea coccinea</i>
American Vetch	<i>Vicia americana</i>
White Heath Aster	<i>Symphyotrichum ericoides</i>
Winged Buckwheat	<i>Eriogonum alatum</i>
White sagebrush	<i>Artemisia ludoviciana</i>

# Vegetation

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## Reference vegetation – Sandstone Breaks Ecology

### Climate

Average Annual Precipitation 14 to 17 inches annually - average 15 inches

Average Annual Air Temperature ranges from 48 to 52 degrees F

Drought conditions in effect

Long-term effects of these latest drought events have yet to be determined. Growth of native cool-season plants begin about April 1 and continue to mid-June. Native warm-season plants begin growth about May 1 and continue to about August 15. Regrowth of cool-season plants occur in September in most years, depending on moisture.

### Ecological Dynamics

The Reference State is characterized by warm-season mid and tallgrasses with a variety of shrubs. Trees (one-seed juniper) may occur in southeastern Colorado. The Warm-Season Shortgrass State is characterized by a warm-season short bunchgrass (blue grama) and grass-like (threadleaf sedge). The Increased Bare Ground State is characterized by early successional warm-season bunchgrass (sand dropseed, Fendler threeawn), annual grasses, and annual forbs.

Recurrent drought has historically impacted the vegetation of this region. Changes in species composition will vary depending upon the duration and severity of the drought cycle, and prior grazing management. Recent drought events have significantly increased mortality of blue grama in some locales.

### Reference State

The Reference State is characterized by 70-90% grasses and grass-likes, 5-15% forbs, and 5-15% woody plants. The principal grasses are prairie sandreed, little bluestem and sideoats grama. Secondary grasses are blue grama, switchgrass and needle and thread. Dominant forbs are American vetch, dotted gayfeather, purple prairie clover and upright prairie coneflower. Key shrubs are chokecherry, skunkbush sumac, western sandcherry, golden and wax currant.

Mid and tallgrasses dominate this community. The principal grasses are prairie sandreed, little bluestem and sideoats grama. Secondary grasses are blue grama, switchgrass and needle and thread. Other important grasses are sand bluestem and big bluestem. Threadleaf and sun sedge are common. Dominant forbs are American vetch, dotted gayfeather, purple prairie clover and upright prairie coneflower. Key shrubs are chokecherry, skunkbush sumac, western sandcherry, golden and wax currant. Other shrubs may include hackberry, mountain mahogany, and others.

### At Risk Plant Community

This plant community developed with continuous grazing without adequate recovery opportunity during the growing season. As a result, blue grama increased. Prairie sandreed, switchgrass, sand blue stem, and Indiangrass have decreased. Little bluestem and sideoats gram are still present as secondary grasses. American vetch, purple prairie clover, leadplant, western sandcherry, chokecherry and currants are present in reduced amounts. Needle and thread may initially increase or decrease depending on the season of grazing use. White sagebrush, Cuman ragweed, hairy golden aster, slimflower scurfpea, soapweed yucca, and prairie sagewort have increased.

# Vegetation

Plant frequency and vigor have decreased. Reduction of warm-season tall/midgrasses and rhizomatous wheatgrass, nitrogen fixing forbs, shrub component and increased warm-season shortgrass has begun to alter the biotic integrity of this community. Water and nutrient cycles are at risk of becoming impaired. Litter levels have been reduced.

## Warm-Season Shortgrass Plant Community

The dominant species are blue grama and threadleaf sedge. These species have developed into a sodbound condition occurring in localized colonies exhibiting a mosaic appearance. Tall-grasses have been removed with the exception of prairie sandreed, which may exist in remnant amounts. Sideoats grama and little bluestem may still be present in small amounts on steeper slopes. Forbs and shrubs that continue to increase are Cuman ragweed (western ragweed), hairy golden aster, prairie sagewort (fringed sagebrush) and soapweed yucca. Species diversity and production have been significantly decreased due to the major reduction of mid and tall-grass species and key shrubs. Energy flow, water cycle and mineral cycle have been negatively affected. Litter levels are very low and unevenly distributed. Soil erosion may be a concern on steeper slopes and exposed areas. Desertification is advanced.

## Sandstone Breaks Ecosystem Vegetative Community Composition

Common Name	Scientific Name
Sideoats Grama	<i>Bouteloua curtipendula</i>
Prairie Sandreed	<i>Calamovilfa longifolia</i>
Little Bluestem	<i>Schizachyrium scoparium</i>
Blue Grama	<i>Bouteloua gracilis</i>
Sand Bluestem	<i>Andropogon hallii</i>
Big Bluestem	<i>Andropogon gerardii</i>
Needle and Thread	<i>Hesperostipa comata ssp. comata</i>
Switchgrass	<i>Panicum virgatum</i>
Western Wheatgrass	<i>Pascopyrum smithii</i>
Canada Wildrye	<i>Elymus canadensis</i>
Sand Dropseed	<i>Sporobolus cryptandrus</i>
Hairy Grama	<i>Bouteloua hirsuta</i>
Indian Ricegrass	<i>Achnatherum hymenoides</i>
Fendler Threeawn	<i>Aristida purpurea var. longiseta</i>
Squirreltail	<i>Elymus elymoides ssp. elymoides</i>
Purple Prairie Clover	<i>Dalea purpurea var. purpurea</i>
Dotted Blazing Star	<i>Liatris punctata</i>
Rush Skeletonplant	<i>Lygodesmia juncea</i>
Crownleaf Evening Primrose	<i>Oenothera coronopifolia</i>
Broadbeard Beardtongue	<i>Penstemon angustifolius</i>
Upright Prairie Coneflower	<i>Ratibida columnifera</i>
Scarlet Globemallow	<i>Sphaeralcea coccinea</i>
Prairie Spiderwort	<i>Tradescantia occidentalis</i>
American Vetch	<i>Vicia americana</i>
Annual Buckwheat	<i>Eriogonum annuum</i>
White Sagebrush	<i>Artemisia ludoviciana</i>